(5.5) Solving Problems Using Quadratic Relations

1. Convert to standard form:

a) $y = -(x + 4)^2 + 10$

b) $y = 3(x - 5)^2 - 7$

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(5.5) Solving Problems Using Quadratic Relations

1. Convert to standard form:

a) $y = -(x + 4)^2 + 10$

$y = -(x+4)(x+4) + 10$

$y = -[x^2+4x+4x+16] + 10$

$y = -[x^2+8x+16] + 10$

$y = -x^2 - 8x - 16 + 10$

$y = -x^2 - 8x - 6$

Standard Form

y int = -6

a value = -1

(-4, 10)

a = -1

b) $y = 3(x - 5)^2 - 7$

$y = a(x-h)^2 + k$

(h, k) (5, -7)

a = +3

$y = 3(x-5)(x-5) - 7$

$y = 3(x^2-5x-5x+25) - 7$

$y = 3(x^2-10x+25) - 7$

$y = 3x^2 - 30x + 75 - 7$

$y = 3x^2 - 30x + 68$

a = +3

y int = +68

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2. Find the equation, in vertex form, if the zeros are -2 and 10 and the y-intercept is 5.

For vertex form we need: _____

_____

When we have the zeros, we start with _____ form.

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2. Find the equation, in vertex form, if the zeros are -2 and 10 and the y-intercept is 5.

$y = a(x-s)(x-r)$

$5 = a(0+2)(0-10)$

$5 = a(-2)(-10)$

$5 = -20a$

$\frac{5}{-20} = a$

$-\frac{1}{4} = a$

$y = -\frac{1}{4}(x+2)(x-10)$

(0, 5)

x y

For vertex form we need: _____

_____

When we have the zeros, we start with factored form.

$\frac{str}{2} = \frac{-2+10}{2} = \frac{8}{2} = 4$ x vertex

$y = -\frac{1}{4}(x+2)(x-10)$

$y = -\frac{1}{4}(4+2)(4-10)$

$y = -\frac{1}{4}(6)(-6)$

$y = -\frac{1}{4}(-36)$

$y = +\frac{36}{4}$

$y = 9$

(h, k)

(4, 9)

$y = a(x-h)^2 + k$

$y = -\frac{1}{4}(x-4)^2 + 9$

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Example 4 p.289

Next Cup

Revenue = (Price)(# of cups sold)

Rev = ($2.60)(200)

= $520

Change Price to Max Revenue

Rev = ($2.60- 0.05x)(200 + 10x)

Vertex?

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Example 4 p.289

Next Cup

Revenue = (Price)(# of cups sold)

Rev = ($2.60)(200)

= $520

Change Price to Max Revenue

Rev = ($2.60- 0.05x)(200 + 10x)

Vertex?

$Rev = (-0.05x + 2.60)(+10x + 200)$

$\frac{-2.60}{-0.05}$ $\frac{-200}{10}$

+52 $\frac{r+s}{2}$ -20

$x_v = \frac{52-20}{2}$

$x_{vert} = \frac{32}{2}$

$x_{vert} = 16$

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Rev = (Price)(# of cups)

Rev = ($2.60- 0.05x)(200 + 10x)

$x = 16$

$Rev = (2.60 - 0.05(16))(200 + 10(16))$

$Rev = (2.60 - .80)(200 + 160)$

$Rev = (1.80)(360)$

$Rev = \$648$

# of price changes | max rev

(16, 648)

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Rev = ($2.60- 0.05x)(200 + 10x)

$Rev = 520 + 26x - 10x - 0.5x^2$

$y = -0.5x^2 - 16x + 520$ - STANDARD

Vertex Form $a = -0.5$

(16, 648)

h k

VERTEX $y = -0.5(x-16)^2 + 648$

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Homework/Classwork:

Pg. 293 # 4 to 6 ac, 7, 9-10 ac, 15, 16

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